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# Alles begann mit Tschirnhaus

Enrico Pasini

## Abstract

Did it all begin with Tschirnhaus? This paper discusses the exemplary role that Tschirnhaus could play in the reconstruction of an empirically oriented, scientific, somewhat radical and variously unorthodox current in 18<sup>th</sup>-century German philosophy, starting from 18<sup>th</sup>-century characterisations of his intellectual image.

## Keywords

Tschirnhaus, W.E.; Experimental Knowledge; ; 18<sup>th</sup>-century German philosophy.

“The only Works of any considerable Value towards the Investigation of Truth in the Sciences, are Lord Bacon’s *Organum Novum*, and the *Medicina Mentis*”<sup>1</sup>

*Alles begann mit Tschirnhaus.* Did it? And what did, if anything, begin with Tschirnhaus? Whichever unprecedented combination of features distinguished his intellectual achievements, is it also relevant for the quest that we are pursuing in this collection of papers? Namely, that of the existence of a current of ‘scientific philosophy’, of an intellectual field that in 18<sup>th</sup>-century Germany be somewhat irreducible to the traditional historiographic alternatives of customary history of philosophy, where philosophy is intertwined with empirical science, medicine, and anti-metaphysicist stances occupy some position not so far from materialism.

Walther Ehrenfried von Tschirnhaus (1651-1708), a quite fascinating figure<sup>2</sup>, was during his life a Cartesian, an adept of Spinoza’s, a traveller and a courtman; he was philosopher, popularizer, mathematician, great technologist and experimenter. It is this complex image that we shall briefly investigate here. His main work was the *Medicina*

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1 □ This surprising utterance is found in *An Essay towards a Compleat Theory of the Human Mind*, an anonymous article in form of a letter to the editor dated “Newcastle Aug. 24, 1740”, and featured as Art. XII in *The History of the Works of the Learned*, 2/1740, pp. 173-189, our quote being at p. 181. The author, to me unknown, is clearly a diehard admirer of Lord Verulam, which makes even more interesting his idea of coupling Tschirnhaus’ philosophical *Meisterwerk* to Bacon’s. A German summary of the article appeared in J.G. Krause’s *Beiträge zu den wöchentlichen herauskommenden Neuen Zeitungen von gelehrten Sachen* for November 5<sup>th</sup> 1742.

2 □ It is still useful to consult H. WEISSENBORN, *Lebensbeschreibung des Ehrenfried Walther v. Tschirnhaus auf Kiesslingswalde und Würdigung seiner Verdienste*, Baerecke, Eisenach 1866. An edifying biography pour l’usage des jeunes gens appeared soon: see C. Gottschling, *Lebens-Beschreibung IV. Gelehrter und Geschickter Edelleute [...] zur Aufmunterung des studierenden Adels*, n.n., Brandenburg an der Havel 1722; pp. 13-21 are devoted to “Dieses Wunder des gelehrten Adels” (p. 13).

*mentis et corporis* (MM<sup>3</sup>), as famous as quickly forgotten<sup>4</sup>: “Non facile excellentius, in Logica doctrina omnique cognitione solida promovenda, Germania nostra opus, *Medicina mentis et corporis*, illustrissimi Tschirnhausenii: quod licet aliquoties recusum sit, tamen adeo paucorum teritur manibus”, wrote Gottsched in his essay *pro receptione*; and consequently he promised a German translation<sup>5</sup>. That he did not keep promise<sup>6</sup> and, as we shall see in a moment, a partial translation of the MM was to appear only in a historical work of the end of the century, does not mean that his peculiar interest in Tschirnhaus declined. Instead, he is curiously mentioned, again and again, in patriotic specimina, among such ‘German’ glories as Copernicus, Kepler, Guericke, Scheiner, Mair, Hevelius, Thomasius, and, of course, Leibniz and Wolff, to testify the flourishing of autonomous lights in Germany:

“In Deutschland hub die Klarheit an; | Copernik war der große Mann, | Dem Keplers Fleiß bald nachgekommen: | Bis Gerke, Scheiner, Marius, | und Tschirnhaus, und Hevelius, | Thomas’ und Leibnitz Platz genommen: | Daraus das heitre Licht entspringt, | Das iizt in aller Augen dringt” (AW 1, 183)<sup>7</sup>.

Such simple listings of names are often empty metric exercises<sup>8</sup>. More effort of appreciation is displayed in the *Lob Germaniens*: “Wenn Gericke die Lufft-Pump ausgesonnen, | Wenn Tschirnhaus Stahl durch Spiegel schmelzen lehrt, | Wenn Sturm und Wolf die Wissenschaften mehrt; | Wer hat uns denn den Vorzug abgewonnen?” (AW 1, 16). Here, however, Tschirnhaus is not associated with the augmentation of science, but with steel-melting device. And in general, more substantial appreciations evade the philosophical ground and privilege burning lenses and mirrors<sup>9</sup>, as in the *Erste Gründe*

3 □ I shall use, along with common abbreviations, the following ones: MM for W.E.TSCHIRNHAUS, *Medicina mentis, sive artis inveniendi praecepta generalia*, Fritsch, Lipsiae 1695; AW for J.C. GOTTSCHED, *Ausgewählte Werke*, hrsg. v. J. BIRKE / P.M. MITCHELL, De Gruyter, Berlin 1968 sqq.; FB for G.G. FÜLLEBORN (hrsg.), *Beiträge zur Geschichte der Philosophie*, Bd. 2, 5. Stück, Frommann, Züllichau-Freystadt 1796. FG for C. THOMASIUS, *Freimütige, lustige und ernsthafte, jedoch vernunftmässige Gedanken oder Monatsgespräche über allerhand, fürnehmlich aber neue Bücher*, 1/1688, issues 1-2, repr. Athenäum, Frankfurt a.M. 1972.

4 □ Although his works were, as it happens, durable sources of factual and medical notions. See f.i. J.C. GOTTSCHED, *Erste Gründe der gesamten Weltweisheit*, II, §542 (AW 5-2, 353). Kant still quotes the *Curiöse Medizin* in the *Anthropologie Mongrovius* (AK 25, 1266).

5 □ J.C. GOTTSCHED, *Iniquitatem exterorum in ferendo de eruditibus nostratibus iudicio*, Breitkopf, Leipzig 1734, f. C4r.

6 □ Martin Knutzen solicited for it still in 1740 (J.C. GOTTSCHED, *Briefwechsel: historisch-kritische Ausgabe*, hrsg. v. D. DÖRING / M. RUDERSDORF, 7, De Gruyter, Berlin 2013, p. 11).

7 □ In this patriotic design he was indeed backed by his wife L. AGOTTSCHED, who similarly argued that Germany makes always headway and has no need for foreign knowledge: “Und was die halbe Welt von Leibnitz neu gelernet, | Hat unser großer Wolf noch besser ausgekörnet. | Was Tschirnhaus sich erwarb, was Gerkens Nachruhm nährt, | Hat Hermanns tiefer Geist durch Trägheit nicht entehrt. | Kurz, Deutschland steigt stets, und hat nicht zu besorgen, | Daß es sein Wissen darf von feichten Nachbarn borgen” (*Briefe der Frau Luise Adelgunde Victorie Gottsched, geborne Kulmus*, 1. Theil, Kanter, Königsberg-Leipzig 1776, p. 267). For some context see G. SCHMIDT (Hrsg.), *Die deutsche Nation im frühneuzeitlichen Europa: politische Ordnung und kulturelle Identität?*, Oldenbourg, München 2010.

8 □ Similar lists (always featuring Tschirnhaus) appear also in prose, f.i. in the footnotes to Gottsched’s translation of the *Theodicy* (G.W. LEIBNIZ, *Theodicee, das ist, Versuch von der Güte Gottes, Freyheit des Menschen, und vom Ursprunge des Bösen*, Försterische Erben, Hannover und Leipzig 1763; see in particular p. 313). Compare his footnotes to pp. 18 and 31 of his wife Luise’s translation of the *Geschichte der königlichen Akademie der schönen Wissenschaften zu Paris*, Bd. 8, J.P. Kraus, Wien 1754.

9 □ Only in the *Rede zum Lobe der Weltweisheit*, the enumeration of intellectual grandees concludes: “die aber alle nur, durch eine gründlichere Erkenntniß der philosophischen Wissenschaften, die andern Gelehrten ihrer Art übertroffen haben” (AW 9-2, 409). Yet this is quite generic.

*der gesamten Weltweisheit*: “Niemand hat es in Verfertigung der Brenngläser höher gebracht, als der Herr von Tschirnhaus, ein deutscher Edelmann”<sup>10</sup>.

There are clues that in the 18<sup>th</sup> century, even if his philosophical writings were not fully appreciated, his deeds — composed of the triad of algebraic discoveries, burning glasses, porcelain — were remembered with recognition and respect. A minor scholar, Karl Gottlob von Anton, Slavic historian and co-founder of the Oberlausitzische Gesellschaft der Wissenschaften, expressed this point of view in 1782:

“Wurden auch vielleicht seine Schriften nicht allemal mit gleichem Beifalle aufgenommen, so verdient doch seine Stärke in der Algeber, seine Erfindung mit dem Porzellan, so verdienen doch seine Brennspiegel und andere optische Gläser Dank und Verehrung”<sup>11</sup>.

A close relationship of theory and practice had already been somewhat characteristic of certain German philosophers like Weigel, or better Leibniz, who chose famously, for the newly founded Berlin Academy of Sciences, the motto *Theoria cum praxi*. Intellectual interest for technical matters dated indeed at least since Agricola’s *De re metallica*, with its rich illustrations of machinery<sup>12</sup>. And there were in 17<sup>th</sup>-century Germany, just like in 16<sup>th</sup>-century Italy, engineers and other men of practice, who wrote important handbooks on matter theory, minerary technology, chemistry, alchemy<sup>13</sup>. In more recent times, a most efficacious instance of the intertwining was indeed the same Leibniz’s connection to Crafft and Brand concerning the discovery and production of phosphorus.<sup>14</sup>

Tschirnhaus shared with such predecessors a conjunction of philosophical, mathematical, and scientific interests, the latter both from the theoretic and the experimental point of view. Besides, it was his mathematical activity that seemed, in a way, to keep all this together; his philosophy was often perceived, not always with a sympathetic attitude, as a mathematician’s philosophy. But in this picture there is more complexity than meets the eye, as they say, and also a double-sidedness that we should address first.

Tschirnhaus is not considered by historians to have been a first-rank mathematician in his age, and this is true, at least if that category is limited to those who could pair themselves with Leibniz and Newton — such as, on the continent, the Bernoulli brothers or

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10 “Vermöge derselben hat er das härteste Holz, wenn es gleich ganz durchwassert war, im Augenblicke angezündet”, GOTTSCHED, *Erste Gründe* cit., I, §763 (AW 5-1, 456; see also AW 5-3, 100). The source is C. WOLFF, *Mathematisches Lexicon, darinnen die in allen Theilen der Mathematick üblichen Kunst-Wörter erkläret...*, Gleditsch, Leipzig 1716, col. 1298: “Zu unseren Zeiten hat niemand vollkommener Brennspiegel gemacht, als der Herr von Tschirnhausen, damit er das Holz unter dem Wasser angezündet, alle Metalle und andere feste Körper geschmeltzet und sie entweder in Glaß oder in einen Kalk verwandelt”.

11 □K. GANTON, *Tschirnhausische Briefe, in Provinzialblätter, oder Samlungen zur Geschichte, Naturkunde, Moral und andern Wissenschaften, herausgegeben von der Oberlausizischen Gesellschaft der Wissenschaften*, Buchhandlung der Gelehrten, Leipzig-Dessau 1782, pp. 109-118, at p. 109. It is remarkable that the author’s aim was to show that Tschirnhaus’ doctrines had had their origins in the Kabalah.

12 □See P. LONG, *Of Mining, Smelting, and Printing: Agricola’s De re metallica*, in *Technology and Culture*, 44/2003, pp. 97-101.

13 □See B. GILLE, *The Renaissance Engineers*, Lund Humphries, London 1966, pp. 55-77 on the ‘German school’. Also see P. O. LONG, *Openness, Secrecy, Authorship Technical Arts and the Culture of Knowledge from Antiquity to the Renaissance*, Johns Hopkins University Press, Baltimore 2001, pp. 117 sqq.

14 □See H. BREGER, *Notiz zur Biographie des Phosphor-Entdeckers Henning Brand*, in *Studia Leibnitiana*, 19/1987, pp. 68-73; G. SCHWEDT, *Leibniz und seine Beziehungen zur Chemie*, in AA.VV., *Nihil sine ratione*, Leibniz-Gesellschaft, Hannover 2001, vol. 3, pp. 1185-1190.

l'Hôpital<sup>15</sup>. It should be stressed that Tschirnhaus had earned initially a very good reputation. In 1687, Jakob Bernoulli wrote to Leibniz: "Illam volo Geometriam, cujus ope Tu cum Nobiliss. vestro Tschirnhausio circa quadraturam circuli dimensionisque aliarum curvilinearum tot tamque praeclara reperistis" (GM 3, 13).

Tschirnhaus had devised, as others did at the time, a correct, albeit limited method for calculating tangents, that was the object of Jakob's interest and had also been for Leibniz a reason of bitter suspects on his former comrade's intention, since it was from Leibniz that Tschirnhaus had learned the first notions of such methods. But the latter's principal results in analysis concern caustics curves, that is, the loci of intersection of rays reflected or refracted by a curved surface: the 'catacaustic' (the caustic by reflexion) of the parabola is called "Tschirnhaus's cubic". On the one hand, such studies were directly connected to his work on burning mirrors. This is important to define the peculiar kind of scientific reputation he would earn: as a renowned historian of inventions put it in 1740, "M. Tschirnhaus avoit beaucoup médité sur cette espèce de courbes, et pénétré bien avant dans leur théorie: mais, ce que n'avoit pas fait M. Bernoulli, il réduisit en pratique cette théorie par les miroirs ardents qui sortirent de ses mains"<sup>16</sup>. We may say that he was easily seen as the rare case of a great algebraist with an experimental vocation.

On the other hand, when he showed that catacaustics are rectifiable he knew to be contributing to the front line of analysis, i.e. its extension to 'mechanical' curves. Tschirnhaus showed awareness of this in his *Nova geometriae promotio*:

"Curvae, quarum ope reliquarum curvarum metior spatia, quaeque primae quasi curvae existunt, et praecipue sunt considerandae, proprietates habent valde notabiles; et in his, quod multis erit inexpectatum, curvae quoque sunt mechanicae, quas Cartesius ex Geometria perperam, ut in *Medicina mentis* clare probavi, eliminavit, quarum proinde usus hinc redditur in Geometria manifestior"<sup>17</sup>.

Tschirnhaus also generalized the construction of an ellipse by means of a fixed string and defined curves with more than two "focal points". In algebra, he gave his name to a method — 'Tschirnhaus transformations' — that can be used to solve cubic and quartic equations. He gave the first examples of that technique, albeit erroneously maintaining that it might have a generality it could not in fact provide<sup>18</sup>. This attitude was the source of much criticism by his contemporaries, at least by those who were part of the mathematical avantgarde. L'Hôpital commented with equanimity in a letter to Leibniz:

"[B]ien que cet auteur se soit trompé assez souvent dans ce qu'il a donné, on ne laisse pas d'y entrevoir beaucoup d'étendue d'esprit, et il auroit été loin s'il avoit suivi vos

15 □A sympathetic and thorough reconstruction of Tschirnhaus' mathematical achievements can be found in M. KRACHT / E. KREYSZIG, *E. W. von Tschirnhaus: His Role in Early Calculus and His Work and Impact on Algebra*, in *Historia Mathematica*, 17/1990, pp. 16-35.

16 □DE JUVENEL DE CARLENCAS, *Essais sur l'histoire des belles lettres, des sciences et des arts*, Duplain, Lyon 1740, p. 264.

17 □W. EXON TSCHIRNHAUS, *Nova et singularis geometriae promotio, circa dimensionem quantitatum curvarum*, in *Acta eruditorum*, 14/1695, p. 489-495.

18 □Leibniz even wrote directly to Tschirnhaus that his methods for cubics and quartics could not be extended to higher degrees, a fact he could demonstrate ("non puto succedere in ulterioribus nisi quoad casus speciales. Ejusque rei videor mihi habere demonstrationem", GM IV, 478-479). Even in the study of his caustics he exposed himself to similar criticisms; see for instance JOH. BERNOULLI, *Opera omnia, tam antea sparsim edita, quam hactenus inedita*, M.-M. Bousquet & Soc., Lausannae et Genevae 1742, vol. 3, p. 464.



methodes. Il est vrai qu'il parle trop avantageusement de ses inventions, et qu'il promet beaucoup et même plus, à ce que je crois, qu'il ne peut executer" (GM II, 254).

Also in the realm of experimental physics Tschirnhaus was subjected to similar alternations of applause and criticism. In this field, although he is mostly famous now because he initiated and supervised investigations on the production of porcelain in Dresden, he was, during most of his life, mainly renowned as the inventor, and a specialist in the realization, of a certain kind of parabolic mirrors made of polished copper. To this kind of focusing mirrors, his name would since be given; even asbestos vitrified, as all other bodies did, if kept long enough in the focus of Tschirnhaus' mirrors, that were still a term of comparison in the late 18<sup>th</sup> century<sup>19</sup>.

Vitrification, it should be remarked, was not a simple curiosity, but the object of a true scientific interest<sup>20</sup>. It was not at all strange that a famous scientist like Herman Boerhaave praised grandiloquently the mirrors that Tschirnhaus had donated to the Duke of Orleans for his scientific cabinet, the careful combination of which surpassed all past experiences in that branch of experimental physics, even the famous ones that had been attributed to Antiquity:

"Antiqui quod specula concava essent mechanici vel physici modi excitandi summum ignem, sed illustris Germanus E. W. De Tschirnhaus confecit ingentia vitra, ex sphaericis, plurimos pedes in diametro ampla, quae donavit duci Aurelianensi, qui constiuit experimenta in suo horto, et invenerunt, quod si duo talia magna vitra sphaerica vel thelescopia haberent, unum ingens, minus alterum, sic polita, focum ab ambobus collectum talem esse, qui omnia corpora nota calcinaret vel funderet, vel in vitrum converteret"<sup>21</sup>.

They had such power, he wrote, that they would calcinate or vitrify any natural substance. Indeed they could change its very nature: "omnia animalia, vegetabilia uno momento vitrescunt, saxa, lapides, metalla etc. funduntur et in vitrum convertuntur, et omnia mutantur in sua natura"; in a word, they were the pinnacle of practical knowledge about generating prodigious heat, "haec summa est ars cognita summum ignem colligendi"<sup>22</sup>. Boerhaave wrote this in 1724; but since the first decade of the century, the power of universal vitrification of Tschirnhaus' mirrors, together with other optical experiences and principles set forth by him in the field of the fabrication of lenses, had been questioned. Hartsoeker had been among the first to cast doubt on some of Tschirnhaus' most bombastic pretensions: "M. de Tschirnhaus a publié bien d'autres experiences que celles de la prétendue vitrification des metaux, qui sont sujettes à caution"<sup>23</sup>. He declared "une impossibilité absolue" of certain results of Tschirnhaus': "si cet habile Mathematicien n'a pas trouvé le secret de changer la nature et les proprietes des

19 ☐ See SNEWCOMB, *The World in a Crucible: Laboratory Practice and Geological Theory at the Beginning of Geology*, Geological Society of America, Boulder 2009, pp. 40-42.

20 ☐ It was testified by authorities like Francis Bacon himself, who noted in the *Historia densi et rari* that "Complura fossilia et metalla, et ex vegetabilibus nonnulla, vitrificantur per ignes fortes" (F. BACON, *The Works*, Baynes and Son, London 1824, vol. 4, p. 95) and raised in an exchange with Othowell Meverell a series of questions concerning minerals, among which specific enquiries concerning vitrification (vol. 9, p. 96).

21 ☐ BOERHAAVE, *Institutiones et experimenta chemiae*, n.n., Parisiis 1724, p. 194.

22 ☐ BOERHAAVE, *Institutiones* cit., p. 194.

23 ☐ HARTSOEKER, *Suite des Conjectures physiques*, Desbordes, Amsterdam 1708, p. 58.

rayons de lumiere, et de les obliger à prendre le chemin qu'il veut contre les loix ordinaires, je ne vois pas en quoi ce beau secret puisse consister"<sup>24</sup>.

The ardour of invention, that had brought him to many undisputable results, was eventually invoked in eulogies as an explanation for this hastiness<sup>25</sup>. And Tschirnhaus' last words were reported to be triumphal, literally: "Ses dernieres paroles furent *Triomphe, Victoire*"<sup>26</sup>. Nevertheless, his whole lifework remained unachieved; in the words of one of his principal scholars, Mühlpfordt, his undertakings were but half-done: "Sein Werk blieb Torso". And he adds to this assessment another disquieting historiographic formula: "So zählt er zu den großen Unvollendeten der Aufklärung"<sup>27</sup>. In contrast to the former, that is usually treated as a *lieu commun*, the latter, i.e. the relation to the *Aufklärung*, constitutes a crucial although not undisputed element in the recent re-appreciation of Tschirnhaus, as it may be represented for instance by Jonathan Israel.

According to Israel, Tschirnhaus was among the chief members of that "small circle of professional and amateur *érudits* active outside formal academic life", to whom is due — maybe not without some aggrandizement — a "crucial scientific-philosophical step which was to have vast implications for all Europe and the wider world", that is, the "seditious business of reworking Descartes's duality of substances, extension, and mind into a one-substance materialism"<sup>28</sup>. This "coterie of writers and thinkers" were the "immediate predecessors intellectually and ideologically"<sup>29</sup> of the great Enlightenment thinkers that followed them. Tschirnhaus, in particular, was a champion of "independent critical thinking" and was under attack precisely because of this, as such attitudes would encourage "Spinozism, libertinism, and 'atheism'"<sup>30</sup>.

Although somewhat reductive<sup>31</sup>, this image of Tschirnhaus corresponds precisely to the most relevant controversy in which he was involved. Although in his capacity of technical expert and advocate of popular education he collaborated with Pietists at a time<sup>32</sup>, in his capacity of public intellectual Tschirnhaus was, as it is well known, harshly attacked on the

24 <sup>□</sup>ARTSOEKER, *Suite cit.*, p. 59. He mockingly added: "M. de Tschirnhaus dit qu'il y a encore de grosses erreurs dans l'Optique qu'il faudroit détruire; mais il feroit un plaisir très-singulier à tous les Dioptriciens de vouloir bien les publier".

25 <sup>□</sup>"Il n'est pas étonnant que l'on fasse quelque faux pas dans des routes nouvelles, et que l'on s'ouvre soi-même. L'esprit original qui est ardent, vif et hardi, peut n'être pas toujours assez mesuré ni assez circonspect. On sent dans le Livre de M. Tschirnhaus cette chaleur et cette audace, qui appartiennent au génie de l'invention. Si l'Auteur n'avoit beaucoup fait, on croiroit volontiers qu'il promet trop, et qu'il élève trop haut nos esperances" (B. de FONTENELLE, *Éloges des académiciens de l'Académie Royale des sciences*, van der Kloot, La Haye 1731, pp. 195-196).

26 <sup>□</sup>FONTENELLE, *Eloges cit.*, p. 206. M. SCHÖNFELD, *Was There a Western Inventor of Porcelain?*, in *Technology and Culture*, 39/1998, pp. 716-727, connects this with the first "breakthrough" in firing unglazed porcelain a few days before (p. 726).

27 <sup>□</sup>MÜHLPFORDT, *Ehrenfried Walther von Tschirnhaus (1651 - 1708). Zu seinem 300. Todestag*, Leipziger Universitätsverlag, Leipzig 2008, p. 60.

28 <sup>□</sup>J. ISRAEL, *Enlightenment Contested: Philosophy, Modernity, and the Emancipation of Man, 1670-1752*, Oxford University Press, Oxford-New York 2006, pp. 32-33. See also the seminal E. WINTER, *Frühaufklärung: Der Kampf gegen den Konfessionalismus in Mittel- und Osteuropa und die deutsch-slavische Begegnung*, Akademie-Verlag, Berlin 1966; E. WINTER, *Der Bahnbrecher der deutschen Frühaufklärung*, in ID. (Hrsg.), *E.W. von Tschirnhaus und die Frühaufklärung in Mittel- und Osteuropa*, Akademie-Verlag, Berlin 1960.

29 <sup>□</sup>ISRAEL, *Enlightenment Contested cit.*, p. 43.

30 <sup>□</sup>ISRAEL, *Enlightenment Contested cit.*, p. 143.

31 <sup>□</sup>"Bei der üblichen einseitigen Charakterisierung Tschirnhaus als frühaufklärerischen Rationalisten und Spinozisten — *was er natürlich auch war* — wurde seine an den Vorstellungen der Frömmigkeitsbestrebungen ausgerichtete Religiosität bislang ausgespart" (A.-C. TREPP, *Von der Glückseligkeit alles zu wissen: die Erforschung der Natur als religiöse Praxis in der Frühen Neuzeit*, Campus, Frankfurt a.M. 2009, p. 362; my italics).



motive of Spinozism by Christian Thomasius<sup>33</sup>, who, in a compte-rendu in dialogic form appearing in his just inaugurated *Freimütige Gedanken*, introduced a *gelehrter Mann* offering *dubia* about pretended eclectic Tschirnhaus' real intellectual affiliations: "Denn ob er gleich wohl wisse, daß der Herr Tschirnhausen kein *Philosophus Sectarius*, sondern ein *Eclecticus* sey, so wäre doch auch nicht zu leugnen, daß [...] auch die heutigen *Philosophi*, wenn sie gleich was neues aufbrächten, dennoch in einem und andern mit denen alten *Philosophis*, oder auch mit andern *Neotericis* überein kämen" (FG, 417-418). As a testbed, propositions from Spinoza's works are brought in to show that in the diversified sects of Cartesians this is Tschirnhaus' flavor (FG, 420-24); the very title of his work is taken from Spinoza (FG, 424-425).

That the title of the *MM* be of Spinozist inspiration, Tschirnhaus will answer, is a ridiculous claim, "ein recht lächerliches *Sophisma*, denn dieses von so vielen andern gesaget worden, daß ihr drunter seyn können, die ich nicht gesehen, noch gelesen" (FG, 774). The reason for the title shall be explained in the forthcoming new edition, from which in fact we apprehend that *medicina mentis* was just, in the intention of the author, a smarter name for philosophy<sup>34</sup>. As for the other accusations, Tschirnhaus presents himself as a believer in some sort of God that maintains his being (FG, 761); he wants not only "die *Philosophie* mit der *Theologie* nicht zu confundiren", but also to find a middle ground where the certainty of revelation does not conflict with knowledge (FG, 777)<sup>35</sup>. Thomasius replies that "das Glauben-Bekäntnüz, das er p. 761 von sich giebet, [...] ist sehr kaltsinnig" (FG, 820) – a kind of lip service to orthodoxy that Spinoza himself might have passed.

Thomasius also remarks that philosophy is identified by Tschirnhaus with the *genuina ars inveniendi* ("denn ich von keiner andern lehre", FG, 781), and this might be bad in itself. But according to Thomasius, atheist Spinozism definitely lurks in Tschirnhaus' definitions of good and of virtue<sup>36</sup>: "in der *definitione boni, et virtutis* steckt eine starcke

32 □SeTREPP, *Von der Glückseligkeit* cit., p. 357 sgg. On the collaboration given by Tschirnhaus in the starting phase of the Halle Orphanage, and the subsequent chilliness, see K.J. WHITMER, *The Halle Orphanage as Scientific Community: Observation, Eclecticism, and Pietism in the Early Enlightenment*, University of Chicago Press, Chicago 2015, pp. 24-28, 59-63 and *passim*.

33 □And later, but in equivalent terms, by Volkmar Conrad Poppo in his *Spinozismus Detectus*. See J.P. WURTZ, *Tschirnhaus et l'accusation de Spinozisme: la polémique avec Christian Thomasius*, in *Revue philosophique de Louvain*, 78/1980, pp. 489-506; W. SCHRÖDER, 'Die ungereimteste Meynung, die jemals von Menschen ersonnen worden'. *Spinozismus in der deutschen Frühaufklärung?* in E. SCHÜRMANN / N. WASZEK / F. WEINREICH (Hrsg.), *Spinoza im Deutschland des 18. Jahrhunderts*, Frommann-Holzboog, Stuttgart-Bad Cannstatt 2002, pp. 121-138; M. WALTHER, *Suppress or Refute? Reactions to Spinoza in Germany around 1700*, in M. LAERKE (ed.), *Use of Censorship in the Enlightenment*, Brill, Leiden 2009, pp. 25-40.

34 □"[Q]uo amabilior omnibus reddetur Philosophia" (*MM*, f. \*\*\*3v).

35 □It might be mentioned, although I do not completely agree, that DPÄTZOLD, *Ist Tschirnhaus' Medicina Mentis ein Ableger von Spinozas Methodologie?*, in L. NAUTA / A. VANDERJAGT (eds.), *Between Demonstration and Imagination. Essays in the History of Science and Philosophy Presented to John D. North*, Brill, Leiden 1999, pp. 339-364, supports in a way Tschirnhaus' apology: "Diesen Zusammenhang von einem systemkonstitutiven Gottesbegriff und wissenschaftlicher Methode [der bei Spinoza üblich ist] wird [...] Tschirnhaus für seine *Medicina mentis* nicht übernehmen. Daß er im übrigen in seinem zweiten Brief auch gezielt nach Spinozas 'wahrer Definition der Bewegung' fragt, legt die Vermutung nahe daß Hobbes' Methodenlehre [vom *De corpore*] im Hintergrund stehen könnte" (345).

36 □On this there were easy misunderstandings. Wolff, in the *Horae subsecivae*, quotes Tschirnhaus identifying the highest good with the knowledge of truth: "Nullam dari voluptatem, quae cum ea comparari possit, quam ex veritatis cognitione percipimus, dudum agnovere viri intelligentes, ita ut vir generosus de scientiis mathematicis benemeritus, *Ehrenfried Waltherus de Tschirnhausen* summum hominis bonum in ea consistere existimaverit" (C. WOLFF, *Horae subsecivae Marburgenses anni MDCCXXIX*, Renger, Francofurti 1729-30, p. 93). This is for Tschirnhaus not the highest good, that he mentions only once in 1695 *MM* and never in 1687 *MM*, but true virtue: "Quas omnia bene perpensa nos

Parthey von *Spinosae* seinem *Atheismo* verborgen” (FG, 823). The conclusion is: “ein Spinosiste”, “Flosculos Spinosismi” (FG, 841), “Blümchen aus des Spinosae Lustgarten” (FG, 847). He will in the end excuse his accusations as “nichts anders, als eine *conjectur*”, insisting at the same time in inquisitorial fashion<sup>37</sup> that according to a testimony Tschirnhaus had been “allezeit ein *Admirator Spinosae* gewesen, und seit dem vielfältige Gelegenheit gehabt, mit *Spinoza* zu *conversiren*” (FG, 824-25). Further protestations by Tschirnhaus stressed uselessly his differands from Spinoza<sup>38</sup>. It was a bit as in the conclusion of Budde’s *Bedencken*: “Ob und wie weit der Autor mit Spinoza übereinkomme, oder nicht? Thut wenig zur Sache”<sup>39</sup> — on which Wolff himself commented: “Nun mag die Spinozisterey ein *absolutum decretum* heissen”<sup>40</sup>.

This would remain a quandary, as can be seen again through Gottsched. Tschirnhaus’ books and instruments had been auctioned; he had possibly burnt his papers. This is mentioned in Wolff’s autobiography, and gives occasion to a remembrance from their meeting around 1705: “wobei ich mich erinnere, daß er mir von Spinoza sagte, er habe keineswegs Gott und die Natur mit einander *confundiret*, [...] sondern Gott *multo significantius* als Cartesius *definiret*”<sup>41</sup>. Gottsched, who, as Wolff’s authorized biographer, knew this text, comments with some discomfort: “Als eine besondere Meynung eines großen Mannes, habe ich solches hier nicht übergehen wollen”<sup>42</sup>. But this was not, ultimately, the reason why the philosophical mainstream of 18<sup>th</sup>-century Germany turned it back on Tschirnhaus.

The above-mentioned translation of the MM is due to Georg Gustav Fülleborn, *Popularphilosoph* made famous by Kant’s reply to his criticisms, who edited in the 1790s a series of *Beyträge zur Geschichte der Philosophie*, of which the largest part was written by him. In the fifth part of the second volume, just after a short presentation of Vanini’s life and thought accompanied by translated excerpts, we find a memory *Über Tschirnhausens Verdienst um die Philosophie* (FB, 32-107). Such essays on the philosophical merits of authors, albeit quite naïve in the intent, are often telling. To assess correctly the relevance of a philosopher, Fülleborn writes, one must distinguish between three kinds of distinction: in the discovery (*Erfindung*) of either individual truths, or entire systems; in

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certos reddunt, ex sola veritatis cognitione talem virtutem, quae sub merito virtutis titulum meretur, originem ducere, [...] haec tria, sapientiam, virtutem ac animi tranquillitatem perfecte in nullo homine, nisi conjunctim, existere; et in his tribus, ita conjunctis, summum hominis bonum, quod in hac vita via naturali possideri potest, solum consistere” (MM, 20-21).

37 □ That had been overall a purely inquisitorial move on ideological bases, since the extent of Tschirnhaus’ connection to Spinoza and Spinozan milieus was not publicly known at the time. On it see R.H. Vermij, *De Nederlandse vriendenkring van E.W. von Tschirnhaus*, in *Tijdschrift voor de Geschiedenis der Geneeskunde, Natuurwetenschappen, Wiskunde en Techniek*, 11/ 1988, pp. 153-178; E. WINTER (Hrsg.), *Der Freund B. Spinozas E.W. v. Tschirnhaus: die Einheit von Theorie und Praxis*, Akademie-Verlag, Berlin 1977; L. SPRUIT / P. TOTARO (eds.), *The Vatican Manuscript of Spinoza’s Ethica*, Leiden, Brill 2011; G. LICATA / O. PROIETTI, *Il carteggio Van Gent-Tschirnhaus (1679-1690). Storia, cronistoria, contesto dell’editio posthuma spinoziana*, EUM, Macerata 2013.

38 □ See also J.-PWURTZ / E.W. VON TSCHIRNHAUS, *Die Tschirnhaus-Handschrift “Anhang an Mein so genanntes Eilfertiges bedencken”. Einführung, Transkription, und Anmerkungen*, in *Studia Leibnitiana*, 15/1983, pp. 149-204, f.i. at pp. 173-175 on virtue and self-preservation.

39 □ FBUDDE, *Bedencken über die Wolffianische Philosophie, nebst einer historischen Einleitung zur gegenwärtiger Controversie*, Schmaltzen, Freyburg 1724, p. 22.

40 □ CWOLFF, *Herrn [...] Buddei [...] Bedencken über die Wolffianische Philosophie mit Anmerkungen erläutert*, Andreäische Buchh., Franckfurt am Mayn 1724, p. 134.

41 □ HWUTKE (ed.), *Christian Wolff’s eigene Lebensbeschreibung*, Weidmann, Leipzig 1841, p. 127.

42 □ J.GGOTSCHED, *Historische Lobschrift des weiland hoch- und wohlgeborenen Herrn [...] Freyherrn von Wolf*, Renger, Halle 1755, p. 18.

systematization; in applying and popularizing<sup>43</sup>. “Ohne Bedenken“, he writes, “glaube ich dem deutschen Denker Tschirnhausen eine Stelle unter den *Erfindern* anweisen zu können, obgleich seine Erfindungen nur mittelbar für die Philosophie wohlthätig geworden sind” (FB, 33). That had been a commonplace of reception: “Ex Mathesi et experimentis incognitas veritates docet detegere [...] Tschirnhausen in sua *medicina mentis*”<sup>44</sup>. But here it is the starting point of a critique of Tschirnhaus’ philosophical orientation.

Fülleborn is at ease with a Lockean conception of the ideas as immediate objects of thoughts and does not like Tschirnhaus’ Cartesian attitude in considering objects of thought the things themselves as represented *in esse objectivo* in ideas. But this is a minor point. Worse is that Tschirnhaus, under the disguise of his *medicina mentis*, wanted to substitute philosophical knowledge with scientific research, while the central role that he gave, great *Erfinder* as he was, to *Erfindung*<sup>45</sup>, to the act and the art of discovery, hampered the development of a true philosophical system; worst of all, he conferred scientific pre-eminence on physics (FB, 44).

In its time, the MM had met with attention. The resuscitator of Academic philosophy Simon Foucher wrote in 1687 to Leibniz, with which he was befriended since the latter’s Parisian years: “On m’a presté le livre de Mr. vostre ami Thirnous *De medicina mentis et corporis*. Je n’en ay lu encor que le commencement et le trouve excellent. Le public en est enrichi. Il y a de beaux sentimens. Je l’estime fort” (A II, 2, 196). Leibniz himself announced the appearance of the *Medicina mentis* to Vincent Placcius with the following patronizing but favorable lines:

“Prodiit nuper in Batavis liber inscriptus: *Medicina mentis & corporis*, auctore Tschirnhusio, equite Lusato, amico meo, in rebus mathematicis omnique philosophia eccellente. Is fuerat initio ex asse Cartesianus, sed cum Parisiis crebro mecum ageret ostendi meliora quedam fundamenta [...] Ceterum multa perutilia in suo libro annotat Tschirnhusius licet nonnumquam de aliorum sententiis suisque pronuntiet paullo liberalius, et in quibusdam Geometricis in paralogismos inciderit”<sup>46</sup>.

Nearly twenty years later, in Jena, Christian Wolff would read the *Medicina Mentis*, at a time when he also read the recently deceased Erhard Weigel’s works. He was particularly struck by the stress on *mathesis generalis*, by the critique of traditional logic, and by the theory of definitions, which is admittedly both the forte and the foible of Tschirnhaus’ epistemology; Wolff was less taken by the role that Tschirnhaus tributes to the

43 □ “Um die Beförderer der Philosophie richtig zu beurtheilen, muß man dreyerley Verdienste unterscheiden. Erstens das Verdienst der *Erfindung*, und zwar entweder einzelner Wahrheiten, oder ganzer Systeme. Zweytens das Verdienst der *Anordnung* und Systematisirung, wodurch einzelne Erfindungen erst gemeinnützig und fruchtbar werden. Und drittens das Verdienst der *Anwendung* und Popularizirung” (FB, 32-33).

44 □ B. STRUVE, *Bibliotheca Philosophica in suas classes distributa*, Baillar, Iena 1707, p. 62

45 □ “Tschirnhausen saget: wer die Erfindungskunst besitzt, der habe zugleich alle andere Wissenschaften in seiner Gewalt” (GOTTSCHED, *Erste Gründe* cit., II, §494, AW5-2, 327).

46 □ Leibniz to Placcius, 10-V-1687; A II, 2, 197-98; the designation of the *Medicina corporis* as *provisionalem*, were also his idea and not the author’s (see the letters between Leibniz and Tschirnhaus in 1682, AT III, 3, 655; 687; 691).

*Erfindungskunst*<sup>47</sup>. Eventually, Wolff had Tschirnhaus read his dissertation<sup>48</sup>: the older philosopher, as it is well known, considered it to be a fruit of his *Medicina mentis*<sup>49</sup>. But soon Wolff took a very different route; already in 1718, in §§21 and 36 of the *Ratio praelectionum*, he observed that mathematical methods cannot be extended out of their proper field, with explicit connection to a criticism of Tschirnhaus' rules as being "nimis generales" to be of use<sup>50</sup>.

Fülleborn praises Tschirnhaus, in the end, precisely for having been a source of inspiration to the young Wolff, who in turn deserves a peculiar merit for detaching himself from some of the master's ideas. In particular, "Tschirnhausen hatte überhaupt die mathematischen Erkenntnisse nicht sorgfältig genug von den philosophischen unterschieden, und sich für die letztern keine besondere Wissenschaft gedacht" (FB, 106). He never adequately differentiated mathematical and philosophical knowledge, and the latter wasn't for him the object of a specific science: a perfect summary of the distance that mainstream philosophy had taken from this unsavory ancestor during the Wolffian grand season.

A further section is titled *Zur Geschichte der mathematischen Methode in der deutschen Philosophie*, a method personified by Wolff, although incepted by Tschirnhaus. But Tschirnhaus was unable to see the limits of the mathematical method, which were rightly perceived by Wolff. Fülleborn writes: "Was Tschirnhausen in seiner *Medicina mentis* davon beybringt, ist ziemlich deutlich und bestimmt: und man sieht, wenn man sein Werk durchgeht, überall den Gang des Mathematikers" (FB, 109)<sup>51</sup>.

Algebraic reasoning was indeed so important for Tschirnhaus, that in the MM it had a foundational role for any other kind of knowledge. The art of discovery was presented, in Leibnizian-like fashion, as the correspondent, on a more general scale, precisely of algebra in mathematics, and, as such, as the genuine philosophy, indeed identifying the latter more with a method than with the laying out of a system:

"quemadmodum in Mathesi ad tertium hunc altissimumque cognitionis gradum perveniendi certa datur scientia, Analysis videlicet speciosa, vulgo Algebra dicta, [...] sic

47 □Concerning the 'science of discovery', it has been argued that Wolff, in his philosophy of science, never really had this kind of discipline in mind (A. CORR, *Christian Wolff's Treatment of Scientific Discovery*, in *Journal of the History of Philosophy*, 10/1972, pp. 323-334). On the relation between Tschirnhaus, Leibniz, Wolff, in matters of philosophy of science it can still be useful H.W. ARNDT, *Einführung*, in C. WOLFF, *Vernünfftige Gedanken von den Kräften des menschlichen Verstandes*, Olms, Hildesheim 1965, pp. 7-102, at pp. 10 sqq., 71-72.

48 □WOLFF (praes.) / L.D. BOLLHAGEN (resp.). *Philosophia practica universalis mathematica methodo conscripta*, Goezcius, Lipsiae 1703.

49 □"[Tschirnhaus] fällte bald gegen andre, die ihn besuchten, ein sehr vortheilhaftes Urtheil davon, und pries sie sonderlich, als eine Frucht seiner Medicinæ mentis an" (GOTTSCHED, *Historische Lobschrift* cit., p. 23). Then he took Wolff under his protection, it is said; in the meantime Wolff had also been, through Mencke, introduced to Leibniz, who would soon give a substantial aid to his career.

50 □See WOLFF, *Ratio praelectionum Wolfianarum in mathesin et philosophiam universam*, Halle, Regner 1718, p. 133 (see also ID., *Gesammelte Werke*, II. Abt., Bd. 36, Olms, Hildesheim 1972, p. 133, for the final edition).

51 □Contrarily, when Tetens in *Über die allgemeine spekulativische Philosophie*, writes that "Wolff war der Genius der mathematischen Wissenschaften bekannt und beständig vor Augen, als er Methoden und Plan festsetzte. Aus dem Tschirnhausen kannte er dazu den Weg der Spekulation" (J.N. TETENS, *Über die allgemeine spekulativische Philosophie. Philosophische Versuche über die menschliche Natur und ihre Entwicklung*, hrsg. v. W. ÜBELE, Reuther & Reichard, Berlin 1913, p. 69), he is paying homage to both of them but also abandoning the mathematical method; see G. STIENING / U. THIEL, *Johann Nikolaus Tetens (1736-1807): Philosophie in der Tradition des europäischen Empirismus*, Berlin, de Gruyter 2014, I, 1.3.



eadem ratione generalis aliqua datur scientia, cujus ope quilibet ea probe instructus non solum quicquid in Mathesi datur occulti, sed omne etiam incognitum, sub intellectum cadens, certa et constanti methodo certo in lucem potis est deducere. Hacque scientia, aut, si mavis, *Ars inveniendi, ipsa est genuina philosophia*, cujus quanta vel ideo sit praestantia, absque proluxa explanatione ex data hac ejus descriptione cuivis statim obvium, et vel ex hoc unico etiam perspicuum esse potest” (MM, c. \*\*4v).

Tschirnhaus, like Descartes had in the *Regulae ad directionem ingenii*<sup>52</sup>, spoke of *mathesis universalis* and, in this regard, distinguished between “tria entium genera: Imaginabilium, Mathematicorum et Physicorum” (MM, 79), with three corresponding kinds of thoughts (MM, 75). Among the *imaginabilia*, a particular office was given, in the *mathesis universalis*, to such objects as are apt to express the relationship between magnitudes. Methodologically, “praeter eligendum, quod facillime imaginationi respondet, et ad quod particularia quaevis matheseos objecta levi negotio reducuntur” (MM, 82). Yet these were not young Descartes’ simple geometric figures, but straight lines, just like the *lineae ordinatim ductae*, or *ordinatae*, by which in post-Cartesian analysis curves could be described algebraically. *Mathesis universalis* was thus characterized by Tschirnhaus as precisely the science that concerns the general study of curves in order to analyze the ratios between variables (MM, 83). Nonetheless, here just as in his mathematical papers, the techniques of analysis — even those that he had learnt from Leibniz and developed to present his own methods<sup>53</sup> — would be treated by him *en algèbriste*.

It is very interesting, then, that when it comes to comparisons Tschirnhaus consistently declares that physics is the most pleasurable science, much superior in this respect to mathematics<sup>54</sup>. Some command of mathematics only enhances that pleasure:

Quanta enim dulcedine, seu interna voluptate mentem, plus quam quaevis alia, revera Physices afficiat cognitio, ipsa etiam experientia clare demonstrat. Fuerunt enim, qui propter haud vulgarem Matheseos cognitionem majores, ac alii, in hac scientia delectationes gustarunt, interim tamen Physices studia adeo Mathesi praetulerunt, ut propemodum huic valedixerint, quo plus temporis mentem tam amoenis speculationibus recreandi haberent: quod certissimum, meo judicio, argumentum est, hanc scientiam majores, quam Mathesin et delectationes menti exhibere degustandas. (MM, 288-289)

Mathematics is not so much useful in itself, than as a method in the search for truth, and its demonstrative proceedings are truly a natural remedy against intellectual wavering, unclarity and false opinions:

“das Studium mathematicum so groß nicht an sich selbst zu schätzen, (ob schon es seinen Nutzen zu Wasser und Lande, im Kriege und Frieden giebt,) als der herrlichen

52 □ I discussed this connection long ago in my *Mathesis und Phantasie. Die Rolle der Einbildungskraft im Umfeld der Descartes’schen Regulae*, in *Studia Leibnitiana*, 24/1992, pp. 160-176. Tschirnhaus was indeed in possession of a transcription of the *Regulae*, of which he sent a copy to Leibniz around 1683 (H. BREGER, *Über die hannoversche Handschrift der Descartesschen Regulae*, in *Studia Leibnitiana*, 15/1983, pp. 108-114).

53 □ By the way, it can be mentioned that Tschirnhaus was also inclined to using other mathematicians’ results as starting point for his own researches, without too much recognition. Leibniz saw his appropriations, at a time, as sheer plagiarism. He was gentle and diplomatic, but very steady in his vindications, in the *De geometria recondita*.

54 □ Pleasurableness is essential to science, as testified by the fact that “hi, qui dulcedinem, quam veritatis acquisitio per nos ipsos affert, semel perfecte gustarunt, aliarum rerum cura parum tanguntur, ac proinde paucis contenti vivere sciunt” (MM, 268).

Methode halber, derer sich die Mathematici bedienen, und darum es fürnemlich von allen, welche die Wahrheit ernstlich lieben, sollte fleissig erlernt werden. Denn weil der Verstand der Menschen auf alle Weise verderbt ist die Wahrheit zu erkennen, und solcher mit tausend Scrupeln und Finsternissen oder tausend falschen Meynungen umgeben, was sollte besser seyn, solchen durch natürliche Mittel wiederum in rechtem Stand zu setzen”<sup>55</sup>.

Every true *Liebhaber der Wahrheit* realizes, out of one’s own experience, that once in possession of a demonstration, even the most cunning objections and cavils are unable to beget dubiety. The habit of careful and exact invention, according to a method, of truths previously unknown, educates to concentration and develops the ability to meditate, a talent rare and precious for listening to the voice of truth:

“Lernt man hiedurch auch durch sich selbst unfehlbare Wahrheiten nicht tentando, sondern durch richtige Wege zu erfinden, die niemahls bekandt gewesen, und acquirirt hiedurch das unschätzbare und rare Talent viel und wohl zu meditiren, was auch die Sensus, die Imagination und unsre Passiones für Impedimenta causiren; und also in Strepitu Mundi vollkommen attent zu seyn, welcher das einzige Ohr ist *per vias naturales* die Stimme der Wahrheit zu vernehmen”<sup>56</sup>.

It must not be overlooked that here, although without any emphasis, Tschirnhaus is clearly embracing a radical anti-Platonic approach: no reminiscence, and no divine sparks play here any role, in favor, instead, of following the ‘natural ways’ that bring to the discovery of new truths. And knowledge is not to be attained by the sole force of the intellectual faculties, just like one does not learn natural philosophy merely from reading:

“Und irren diejenigen sehr, die vermeinen, daß wir *per solum Intellectum* alle Wahrheiten erkennen können, als dieselbe, so vermeynen, es könne *per solam scripturam*<sup>57</sup> alle uns nützliche Wahrheit in Physicis und andern *scientiis* entdeckt werden”<sup>58</sup>.

Those natural ways proceed through experience. Tschirnhaus’ subjective mark of all truths is, in the inspiration, still Cartesian: “quicquid potest concipi, verum est, adeoque ita acquirimus veritatem; quicquid autem concipi nequit, est falsum, atque sic falsitatem detegimus” (MM, 165). Experience and experiments are of much greater importance, though, than in Cartesian orthodoxy. Could Tschirnhaus’ contemporaries pick this out in his pages? There is ambiguity, indeed, between two possible readings: one more attentive to positions relative to academic distinctions of philosophical schools, and of purely philosophical doctrines; the other rather, one would say, to content.

I should like to compare two similar passages from two quite different sources, that both discuss the variety of truth criteria, that is, *Wahrheitsgründe*<sup>59</sup>, across different philosophical doctrines. One, written mid-1710s, was possibly by a Leipziger post-graduate

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55 □E.W. voßTSCHIRNHAUS, *Gründliche Anleitung zu nützlichen Wissenschaften, absonderlich zu der Mathesi und Physica wie sie anitzo von den Gelehrtesten abgehandelt werden*, Ritschel, Frankfurt-Leipzig 1708 (Stuttgart, F. Frommann, 1967), p. 17; *Schriften zur Erziehung*, Stuttgart, Steiner 2003 (*Gesamtausgabe*, Reihe 1., *Werke*, Abt. 5.), p. 52.

56 □SCHIRNHAUS, *Gründliche Anleitung* cit., p. 17; *Schriften zur Erziehung* cit., pp. 52-53. See for context S. CORNEANU, *Regimens of the Mind: Boyle, Locke, and the Early Modern cultura animi Tradition*, University of Chicago Press, Chicago 2011.

57 □This, for a purported Lutheran, was also a little impertinent.

58 □SCHIRNHAUS, *Gründliche Anleitung* cit., p. 8; *Schriften zur Erziehung* cit., p. 48, and see p. 185.



student, and was issued in the context of a controversy on purported magical practices *bzw.* satanic interventions in connection to the accidental death of a group of people in Jena. The author meant to eruditely show the disparateness of philosophers' opinions on truth and knowledge, and among other reported:

“*De fundamento vero veritatis* hat Scherzerus, Poiret, Weigelius etc. gesagt, *quod sit sola Dei Voluntas*; Spinoza et Puffendorfius, *sola essentia sine voluntate Dei*; Tschirnhausen, *Experientia cum intellectu*”<sup>60</sup>.

The second one is due to the Salzburger ecclesiastic Dominic Beck, who would later be a teacher of experimental physics, but at the time was burdened with teaching logic, and thus began writing a handbook by chapters, that were presented as dissertation. In a passage similar in object to the preceding, we read:

“*Varii varia veritatis criteria statuebant. Pythagoras solam animam hominis, ideas Plato, Epicurei sensus, Aristoteles pro sensibilibus sensu, pro immaterialibus intellectum, Cartesius claram atque distinctam rei notionem, Malebranchius aeternam animi coactionem ad assensum evidentibus praestandum[,] Tschirnhausen conceptibilitatem rei solis verbis aequae in mente alterius, ac in nostra est, excitandam, solam Dei auctoritatem Huetius, Spinoza humanam rationem tanquam particulam mentis Divinae, Laibniti 1) intellectum 2) sensus 3) auctoritatem, et 4) evidentiam pro constantibus veritatis notis assumpsere*”<sup>61</sup>.

We might now appropriately remark that such knowledge of philosophical terminology and distinctions is, according to Tschirnhaus himself, just *verbalis*, or *nominalis*, the lowest possible level in philosophy; to be able to discriminate one sect from the other is just *cognitio historica*; to become a *realis Philosophus* one must study the things themselves:

“*Hoc siquidem Philosophi realis nomen illi saltem competit, qui ad tantum pervenit cognitionis gradum, ut re ipsa observet, in sua potestate esse, quicquid incognitum sed*

59 □ In the sense of M. FLEISCHER, *Wahrheit und Wahrheitsgrund. Zum Wahrheitsproblem und zu seiner Geschichte*, De Gruyter, Berlin 1984.

60 □ See *Raisonnement auf die Vorrede des Herrn Autoris der unpartheyischen Prüfung*, in *I. Continuatio Des Aller Orten Wegen des in der Christ-Nacht 1715 zu Jena geschehenen magischen Casus mit magischen Grillen beschäftigte Mercurii. Oder ohnpartheyische Eröffnung desjenigen Raisonnements, Welches dieses Casus wegen, Über die unpartheyische Prüfung, auf des Herrn Candidat Schultzens, Wider Herr D. Andreæ Gegensatz gemachte Anmerckungen, ist gefällt worden...*, n.n., An einem Orthe, wo man die Wahrheit zu wissen verlanget 1716, pp. 4-19, at p. 5. The “Herr Candidat Schultze” to whom the *Raisonnement* is attributed could be Friedrich (1690-1766), who was still studying in Leipzig (where he published in 1711 a short paper with two even less famous confreres) and only in 1736, after an ecclesiastical career, would submit an *Inauguraldissertation* in Wittenberg. Part of or all the series of three works (*Der Aller Orten...* and its two continuations) is in some catalogues attributed to a Julius Tamianus, on the basis of the *II. Continuatio des Aller Orten Wegen...* of 1716, that incorporates this pseudonymous author's *Sendschreiben an Hieronymum Pistellum*. See G. STOLLE, *Kurtze Nachricht von den Büchern und deren Urhebern in der Stollischen Bibliothec*, Meyers seel. Wittwe, Jena 1733, 1. T., pp. 278-279; S. BACHTER, *Anleitung zum Aberglauben. Zauberbücher und die Verbreitung magischen 'Wissens' seit dem 18. Jahrhundert*, diss., Universität Hamburg, 2007.

61 □ D. BECK (praes.) / J. VON SCHIDENHOFEN / H. VON HEFFNER (respp.), *Praxis logicae in Alma Archi-Episcopali Benedictina Universitate Salisburgensi una cum Parergis ex philosophiae*, J.J. Mayr, Salisburgi 1763, §13, p. 4; later incorporated in D. BECK, *Institutiones logicae [...] in usum philosophiae auditorum*, J.J. Mayr, Salisburgi 1780; see §273, p. 122.

humano tamen intellectui pervium est, propriis ingenii sui viribus in lucem producere” (MM, \*\*4r-v).

Now real things, *realia*, are first and foremost material entities: “ea omnia sunt, quae ut materialia concipimus, hoc est, quae extensionem, non puram seu penetrabilem, qualis est Mathematica, sed impenetrabilem, qualis omnium corporum est, praesupponunt” (MM, 76). It also seems from this quote that Tschirnhaus professes a theory of matter that is not Cartesian. He maintains in fact that matter can never be in absolute quiet, even in point of theory: “Extensionem enim absque motu concipere, juxta me repugnat” (MM, 180), and since for him conceivability is the mark of truth<sup>62</sup>, the Cartesian autonomy of extension is untenable.

Tschirnhaus was solicitous about the diffusion of science, in particular of physical science and its application to medicine and to practical life. Although the MM remained untranslated, he translated into German the *Medicina corporis*, and wrote in German other works. Moreover, he had foreign works translated at his own expense — in the *Elogium* that appeared in the *Acta eruditorum* we read: “Plurimum praeterea exstant in nostris officinis aliorum libri, qui ipsius cura aut suasu, interdum etiam sumptu, nulla ejus facta mentione, prodire”. What comes immediately to the mind of the author of the *Elogium* is Lémery’s *Cours de chymie*: “sic haud ita pridem Lemery Cursus Chemiae ipsius cura versus ac editus fuit, ut alios nunc taceamus”<sup>63</sup>. It is compelling that Tschirnhaus would translate a text of practical and medical chemistry, based on a corpuscularist paradigm:

“Le nom de Principe en Chymie, ne doit pas estre pris dans une signification tout à fait exacte; car les substances qu’on appelle ainsi, ne sont Principes qu’à notre égard, et qu’entant que nous ne pouvons aller plus avant dans la division des corps, mais on comprend bien que ces Principes sont encore divisibles en une infinité de parties qui pourroient, à plus juste titre, estre appellées Principes [...] Cet Art servira comme d’une échelle pour y atteindre, et la division des substances, quoique grossiere, donnera une fort grande idée de la Nature et de la figure des premiers petits corps qui ont entré dans la composition des Mixtes”<sup>64</sup>.

In real things “nil aliud est praeter materiam, et, quae hic fiunt, necessario per motum fieri concipiuntur”; consequently, physics deals only with matter, movement and rest: “tria tantum in physicis erunt elementa: Materia, Motus ac Quies”. These are the three ‘first definitions’, “quorum ope dein omnium formationem explicamus” (MM, 89). Indeed some attention to this fact, says Tschirnhaus, could solve all the doubts that Bernier raised on that same Gassendian philosophy that he had famously divulged<sup>65</sup>. Correspondingly, a corpuscular theory of light is introduced, experientially witnessed by the fact that a ray of

62 □ “Hinc ergo efficitur, falsitatem quidem consistere in eo, quod non potest concipi; veritatem vero in eo, quod potest concipi” (MM, 35).

63 □ See *Elogium Ehrenfridi Waltheri a Tschirnhaus*, in *Acta eruditorum*, 28/1709, pp. 41-48, at p. 46.

64 □ LÉMERY, *Cours de chymie contenant la manière de faire les operations qui sont en usage dans la medecine, par une methode*, Estienne Michallet, Paris 1687. On him see J.-C. GUEDON, *Protestantisme et chimie: le milieu intellectuel de Nicolas Lémery*, in *Isis*, 65/1974, pp. 212-228; A. CLERICUZIO, *Elements, Principles and Corpuscles: A Study of Atomism and Chemistry in the Seventeenth Century*, Kluwer, Dordrecht 2000, pp. 170 sqq.

65 □ Tschirnhaus would stick up for Gassendian Epicureism in the aftermath of the controversy with Thomasius, whom he reproached in the *Anhang* for acting as if he “nicht wüßte, was für ein unterschied unter einen Epicurer und Epicureer[,] unter der lehre des Epicuri, und Eines Epicurei de Grege porcorum sey, ingleichen in was vor aestim die Philosophia Gassendi bey der heutigen gelehrten weld geachtet werde” (WURTZ / TSCHIRNHAUS, *Die Tschirnhaus-Handschrift* cit., p. 199).

strong sunlight that offends our eye has passed through the window glass; a fact that will also be useful “ad alicui ostendendum stupendam quorundam corpusculorum exiguitatem” (MM, 187), analogously to many experiments on “animalcula [...] admodum minuta” (MM, 188).

There was a deep connection between his being an enthusiast of corpuscular and experimental physics, on the one hand, and on the other hand a *Frühaufklärer*. As we read in the MM, “certum est, nullam absque Physica posse concipi scientiam; ex hac autem rite explicata omnes alias derivari”. Physics is, according to Tschirnhaus, the only ‘divine’ science, since “opera Physices considerare nihil aliud sit, quam ipsius Dei actiones considerare” (MM, 283). Knowledge of physics not only sets free from innumerable prejudices, but it really brings about a sort of philosophical transfiguration, making the reader a completely new person: “Hujus quoque scientiae cognitio nos a tam innumeris liberat praejudiciis, ut (...) aliquis mediante genuina Physica homo veluti mere novus evadat, et quasi philosophice regeneretur” (MM, 283-84).

With a truly Spinozist accent Tschirnhaus remarks that “sapiens animi multo liberioris, and infinitis gradibus majorem prae ignorantibus potentiam habeat”. Moreover, being free from the infinite “impedimenta sive praejudicia”, the learned can discover infinite things still unknown and can also “dirigere experimenta, ut plerumque magnam adferant utilitatem”, while the ignoramuses make a lot of attempts wasting time and money. In fact, one must learn “non [...] tantum, quam necessaria ad bene in his philosophandum sint experimenta, sed etiam qualia esse debeant, seu in quem finem sint instituenda” (MM, 85).

Experiments, what is more, are instrumental, rather indispensable, in the observational gathering of those condition of the generation of an object that allows real definitions<sup>66</sup>. “Primo considerandus est locus, in quo aliquod ens formatur [...] Secundo, hoc peracto, experimentis postea cognoscendum, quae necessario et sola quidem ad rei alicujus generationem juxta hanc regulam requirantur” (MM, 86-87)<sup>67</sup>.

In the end, Tschirnhaus stands out for this strenuous effort to combine all the right ingredients — a champion of invention and research and of the joy of it, a mathematician and experimental scientist, a Cartesian with a sense for the hardness and the movements of matter; an anti-Platonist, a corpuscularist, and a spinozist in his way. Themes that we shall see re-played in 18<sup>th</sup>-century German scientific thought, orthodox and un-orthodox, appear here extraordinarily undetached. It could be the expression, in his works and activity, of a cultural, philosophical, scientific and historical need that endeavored to be fulfilled; something that was being set in motion by itself and would happen with him or without, but of which he is an early and satisfying symbol.

66 □ Even the principles that Tschirnhaus sets as pillars of human knowledge (“1. *Me variarum rerum conscium esse, quod principium primum et generale totius nostrae cognitionis est. 2. Me bene a quibusdam, a quibusdam vero male affici, principium primum est, unde [...] tota doctrina Moralis derivatur. 3. Quaedam a me posse concipi seu cogitatione apprehendi, quaedam autem a me nullo modo posse concipi [...] 4. Tandem me varia sensuum externorum, itemque imaginum internarum et passionum ope advertere, [...], unde omnia, qua ipsi experientia debemus, emanant*”, MM, f. \*\*\*3r) are supplied by experience: see the treatment of 2 and 3 at MM, 291-292.

67 □ In these experiments, again evoking microscopic corpuscularity, “continuo ulterius procedendum est, donec accessus oculis [...] pateat” (MM, 88).